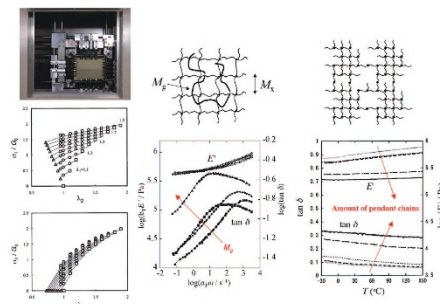


AWARD ACCOUNTS

SPSJ Wiley Award Accounts

Network Topology–Mechanical Properties Relationships of Model Elastomers

The correlations between network topology and mechanical properties have been investigated using model elastomers with well-characterized structures prepared by end-linking precursor polydimethylsiloxane with multifunctional silane. Several modern entanglement theories are critically assessed on the basis of the biaxial stress–strain relations obtained by a custom-built instrument. The unusually high extensibility of the deswollen networks and the viscoelastic relaxations of the networks containing unattached guest chains and pendant chains are examined and their correlations with the network topology are elucidated.

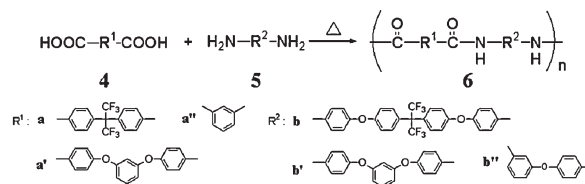


K. URAYAMA
Vol. 40, No. 8, pp 669–678 (2008)

SHORT COMMUNICATION

Synthesis of Aramids by Polycondensation of Aromatic Dicarboxylic Acids with Aromatic Diamines Containing Ether Linkages

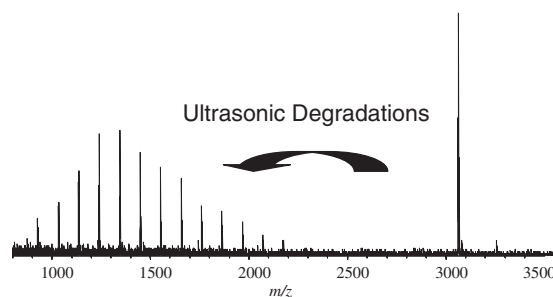
Aramids with high molecular weights can be successfully prepared by the direct polycondensation of aromatic dicarboxylic acids and diamines containing ether linkages. This method is applicable for the synthesis of aramids with T_g s up to around 250 °C.



Y. SHOJI, K. MIZOGUCHI, and M. UEDA
Vol. 40, No. 8, pp 680–681 (2008)

MALDI-MS Analysis of Ultrasonic Degradations of Uniform PMMA

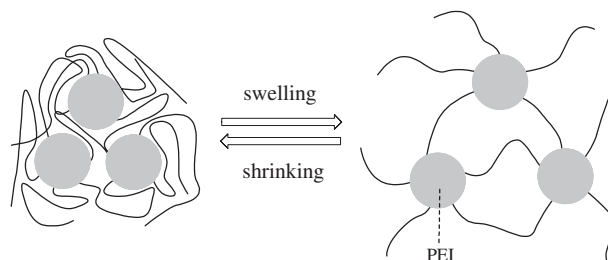
We investigated ultrasonic degradation of uniform poly(methyl methacrylate) (PMMA), with polymerization degree $n = 29$, in an acetonitrile/water (1:1) mixture by matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOFMS). The degradation of PMMA occurs at a low ultrasonication time of 20 s by a random-chain scission around the center of the chain, and the end group of *tert*-butyl of undegraded PMMA converted into hydrogen atoms by ultrasonication at an early stage.



Y. TAKEDA, H. KAWASAKI, T. WATANABE,
K. UTE, and R. ARAKAWA
Vol. 40, No. 8, pp 682–683 (2008)

Stimuli-Responsive Guest Binding and Releasing by Dendritic Polymer-Based Hydrogels

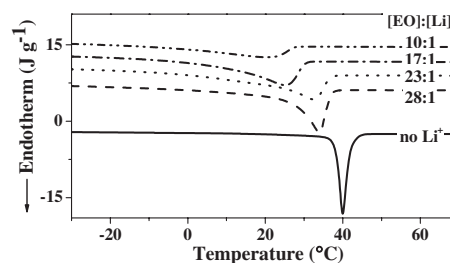
Novel dendritic polymer-based hydrogels having stimuli-responsive molecular recognition ability has been created. Hyper-branched polyethyleneimine (PEI) was modified with methacryl groups and then copolymerized with acrylamide. The resultant copolymers reversibly bound and released guest molecules. We found that the binding and releasing are dependent on solvent composition and pH. It was explained that the polyacrylamide chains act as a barrier by which diffusion of guest molecules are physically blocked.



Y. KANEKIYO, H. TAO, and B. SELLERGREN
Vol. 40, No. 8, pp 684–687 (2008)

Effect of Lithium Ion Concentration on Thermal Properties in Novel Single-Ion Polymer Electrolyte

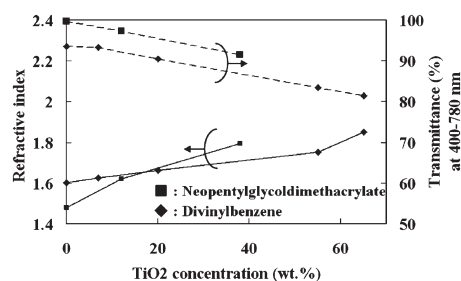
Crystallinity of the heptadecane side group was influenced strongly by the presence of lithium ion, probably due to the coordination with ethylene oxide unit, thereby rearranging the crystalline structure. As a result, two general observations were made as the concentration of lithium ion was increased. First, the melting temperature of heptadecane crystalline was lowered. Second, the thermal transition peak became broaden.



S.-W. RYU
Vol. 40, No. 8, pp 688–693 (2008)

High-concentration Transparent TiO₂ Nanocomposite Films Prepared from TiO₂ Nanoslurry Dispersed by Using Bead Mill

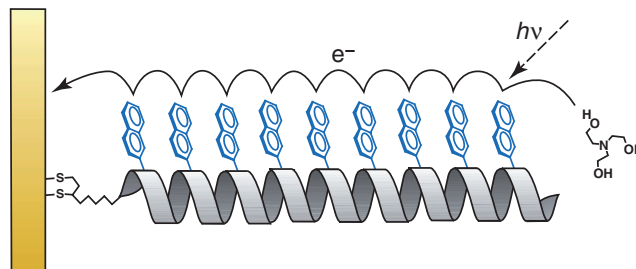
We developed TiO₂ nanocomposite films (65 wt.% TiO₂, refractive index of 1.85 and transmittance of 81.5%). Finely dispersed TiO₂ nanoslurry was obtained by bead mill. In the direct dispersion in monomers, 20 wt.% TiO₂ was incorporated in the film. Furthermore, replacement of the disperse medium into the monomers after the dispersion in butylacetate was an extremely effective method, using which we could obtain higher TiO₂ concentrations with greater transparency as compared to the results obtained using the direct dispersion method.



M. TAKEDA, E. TANABE, T. IWAKI,
A. YABUKI, and K. OKUYAMA
Vol. 40, No. 8, pp 694–699 (2008)

Enhanced Photocurrent Generation by Electron Hopping through Regularly-Arranged Chromophores in a Helical Peptide Monolayer

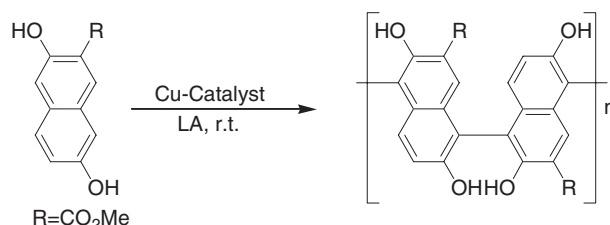
Helical peptides carrying multiple chromophores in a linear manner were synthesized and self-assembled on gold. Photoexcitation of the chromophores generated an anodic photocurrent in water with an electron donor. Theoretical simulations revealed that the regular arrangement of chromophores effectively suppresses quenching of the excited state by gold and facilitates efficient electron hopping among the chromophores, resulting in efficient photocurrent generation.



T. MORITA, K. YANAGISAWA, and S. KIMURA
Vol. 40, No. 8, pp 700–709 (2008)

Lewis-Acid-Assisted Highly Selective Oxidative Cross-Coupling Polymerization with Copper Catalysts

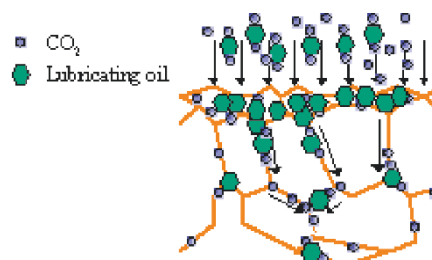
The asymmetric oxidative cross-coupling polymerization with the binary catalyst system of the copper complex and the Lewis acid was carried out. The polymerization of methyl 3,7-dihydroxynaphthalene-2-carboxylate using the copper(I)-bisoxazoline catalyst at room temperature under an O₂ atmosphere in the presence of Yb(OTf)₃ proceeded with a cross-coupling selectivity of 97%.



P. YAN, T. TEMMA, and S. HABAUE
Vol. 40, No. 8, pp 710–715 (2008)

Surface Modification of Engineering Plastics through Swelling in Supercritical Carbon Dioxide

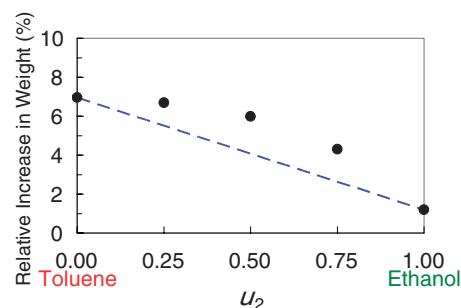
Under the supercritical condition, carbon dioxide dissolves the lubricating oil. The lubricating oil dissolved in supercritical carbon dioxide is infused into the polymer together with carbon dioxide. Further, it was ascertained the high-concentration layer of lubricating oil having the thickness of about 30 μm was formed at the vicinity of surface area for crystalline polymer.



T. TAKAJO, A. TAKAHARA, and T. KICHIKAWA
Vol. 40, No. 8, pp 716–724 (2008)

Equilibrium Swelling of Poly(*p*-phenylene sulfide) in Toluene-Ethanol Mixtures

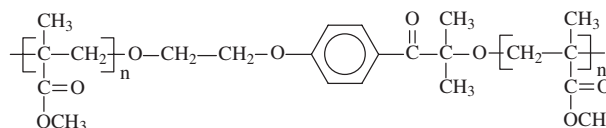
Relative increase in weight of poly(*p*-phenylene sulfide) (PPS) plates immersed in mixtures of toluene and ethanol at 60 °C was examined as a function of the volume fraction u_2 of ethanol in the mixed liquid. It is found that the experimental data points deviate upward from the straight line connecting the two data points at $u_2 = 0$ (pure toluene) and $u_2 = 1$ (pure ethanol). Such behavior may be quantitatively explained by the Flory–Huggins theory with proper assumptions.



Y. FUJII
Vol. 40, No. 8, pp 725–728 (2008)

Synthesis and Characterization of a Novel Mid-Chain Macrophotoinitiator of Poly(methyl methacrylate) by Ce(IV)/HNO₃ Redox System

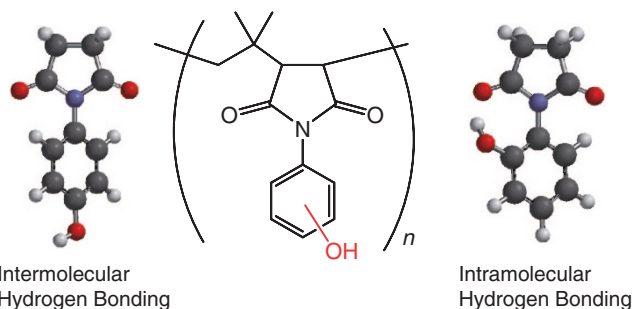
Dihydroxy functional a photoinitiator (HE-HMPP) has been used as reducing agent in redox initiated free-radical polymerization of methyl methacrylate (MMA) in conjunction with cerium(IV) ammonium nitrate in aqueous nitric acid at 40 °C to obtain a novel mid-chain macrophotoinitiator of poly(MMA). The effects of Ce(IV) HE-HMPP, and MMA concentrations on the polymerization rate were investigated. The IR, H NMR, UV, photodegradation, and fluorescence spectroscopic studies revealed that poly-(MMA) with desired photoinitiator functionality in the polymer chain was obtained.



M. DEGIRMENCI, M. A. AKBULUT,
S. HICRI, and H. YILMAZ
Vol. 40, No. 8, pp 729–735 (2008)

Thermal Properties of *N*-Phenylmaleimide-Isobutene Alternating Copolymers Containing Polar Groups to Form Intermolecular and Intramolecular Hydrogen Bonding

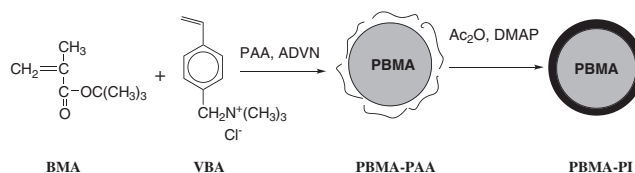
We have demonstrated that the alternating copolymers obtained from *N*-phenylmaleimides having hydroxy and carboxy substituents and isobutene show excellent thermal stabilities. The role of intermolecular hydrogen bonding for an increase in the glass transition temperature by the introduction of the polar groups was investigated by temperature-controlled IR spectroscopy. The molecular conformations were discussed on the basis of the results of DFT calculations for model compounds of the repeating unit in the copolymers.



A. Omayu and A. MATSUMOTO
Vol. 40, No. 8, pp 736–742 (2008)

Preparation of Poly(*t*-butyl methacrylate)-Polyimide Particles by Dispersion Polymerization of *t*-Butyl Methacrylate Using Poly(amic acid) as a Stabilizer and Subsequent Imidization

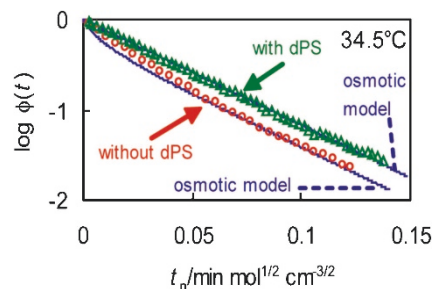
Dispersion polymerization of *t*-butyl methacrylate (BMA) and 4-(vinylbenzyl)trimethylammonium chloride was conducted in ethanol-water medium using various aromatic poly(amic acids) (PAA) as stabilizers. The monodisperse particles with PAA were obtained in high yield using the optimum solvent depending on the PAA structure. The imidization of PAA on the particles proceeded with acetic anhydride and *N,N*-dimethylaminopyridine to form PBMA-polyimide (PBMA-PI) particles. The PBMA-PI particles were maintained in spherical shape by the thermal treatment up to 280 °C.



S. WATANABE, T. OHMURA, K. UENO,
M. MURATA, and Y. MASUDA
Vol. 40, No. 8, pp 743–748 (2008)

Kinetics of Living Anionic Polymerization of Polystyrenyl Lithium in Cyclohexane

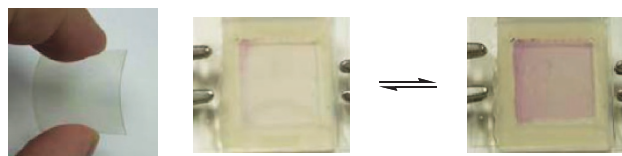
Residual monomer fraction ϕ during anionic polymerization of protonated polystyrenyl lithium (hPSLi) in cyclohexane at 34.5 °C was traced in presence/absence of chemically inert deuterated DPS. Small differences of M_{hPSLi} and C_{hPSLi} for the two cases have been corrected in the normalized time, t_n . The difference of ϕ for these cases suggests that the polymerization proceeds through dissociated hPSLi unimers as well as their fused aggregates and dPS osmotically suppresses the latter route of polymerization.



E. MISHIMA, Y. MATSUMIYA,
S. YAMAGO, and H. WATANABE
Vol. 40, No. 8, pp 749–762 (2008)

Totally Organic Polymer-Based Electrochromic Cell Using TEMPO-Substituted Polynorbornene as a Counter Electrode-Active Material

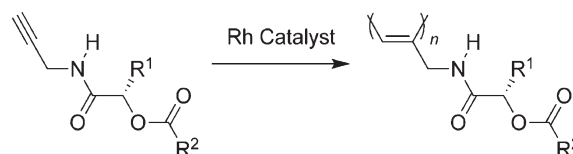
Electrochromic (EC) cells using organic redox active materials on a working electrode and a radical polymer on a counter electrode were fabricated. The electrochemical and optical properties of the EC cell were evaluated. By using radical polymer, the EC cell worked as a low-energy driven cell.



Y. TAKAHASHI, N. HAYASHI, K. OYAIZU,
K. HONDA, and H. NISHIDE
Vol. 40, No. 8, pp 763–767 (2008)

Helical Poly(*N*-propargylamide)s Derived from Lactic Acid: Effect of *O*-Acyl Groups on the Secondary Structures

A series of optically active novel *O*-acylated *N*-propargyllactamide derivatives were synthesized and polymerized with a rhodium catalyst to obtain the corresponding polymers with moderate molecular weights. The polymers took helical structures with predominantly one-handed screw sense stabilized by intramolecular hydrogen bonding between the amide groups in the side chains in various solvents. The bulkiness of the substituents affected the degree of one-handedness, tightness and stability of helical structure of the polymers.

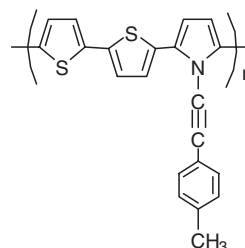


F. SANDA, T. FUJII, M. SHIOTSUKI, and T. MASUDA
Vol. 40, No. 8, pp 768–774 (2008)

NOTE

Preparation of New π -Conjugated Thiophene-Pyrrole Copolymers Having Ethynyl Substituents at the *N*-Position of Pyrrole

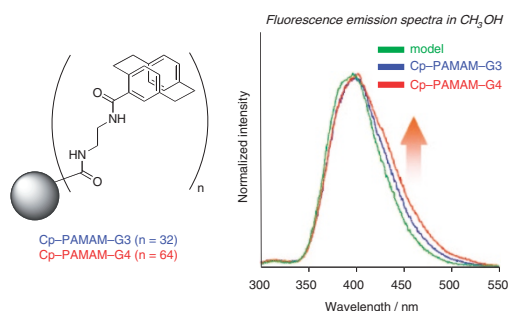
Three π -conjugated alternating copolymers with $-C\equiv CR$ ($R = -Ph$, tolyl, or $-Th_3Hex$) substituents at the *N*-position have been prepared (an example is shown) and their chemical properties have been investigated.



T. YAMAMOTO and R. YAMASHITA
Vol. 40, No. 8, pp 775–778 (2008)

Synthesis of PAMAM Dendrimers Possessing [2.2]Paracyclophane on Their Surface

The first synthesis of third- and fourth-generation polyamidoamine (PAMAM) dendrimers possessing [2.2]paracyclophane on their surface was achieved. The installation efficiency of the cyclophane units on the dendrimer surface is found to be high according to the NMR and UV titration studies. Their optical properties were investigated, and the π - π interaction among [2.2]paracyclophane units on the dendrimer surface in the excited state was observed.



Y. MORISAKI, Y. SHIOTANI,
L. LIN, and Y. CHUJO
Vol. 40, No. 8, pp 779–783 (2008)